

CLAIM AMENDMENTS

Claims 1 to 23 (canceled)

1 Claim 24 (new) An operating method for a packaging
2 machine of the "sleeve" type, which wraps sheets of packaging
3 material around objects, in which the said machine comprises:

4 a first object conveyor for feeding the objects
5 longitudinally in a spaced sequence;

6 a second object conveyor, located downstream of and at a
7 short distance from said first object conveyor thus forming a first
8 opening between said first and said second object conveyors for
9 receiving objects arriving from said first object conveyor and for
10 transporting said objects along a wrapping plane which has an entry
11 end and an exit end;

12 a third object conveyor located downstream of and at a
13 short distance from said second object conveyor and forming
14 therewith a second opening between the second and said third
15 object conveyors for receiving the objects arriving from said
16 second object conveyor;

17 a sheet wrapper, located in proximity to said second
18 object conveyor and comprising at least one suspended wrapping bar
19 which is oriented transversely with respect to a direction of
20 advance of the objects and adapted to move through said first and
21 said second openings along an orbital path which circumscribes the

22 top of the said second object conveyor, and can transport said
23 sheets;

24 a sheet conveyor having a conveyor belt, positioned
25 underneath and aligned with said first opening, for feeding the
26 sheets into said first opening (A1); and

27 a synchronizer for synchronizing said conveyor and said
28 sheet wrapper with each other, said method comprising the steps of
29 moving on said conveyor belt and toward said first
30 opening a sheet having a configuration that comprises at least a
31 portion of accumulation of packaging material in which the packing
32 material is accumulated along a segment of said conveyor belt and
33 with at least one crest; and

34 moving the wrapping bar upward through said first
35 opening when said portion of accumulation of packaging material is
36 disposed in proximity of said first opening.

1 Claim 25 (new) The operating method defined in claim 24
2 wherein the sheet disposed on said conveyor belt has a configura-
3 tion comprising a first portion in which the packaging material is
4 spread out on said conveyor belt and wherein said first portion is
5 positioned downstream with respect to said portion of accumulation.

1 Claim 26 (new) The operating method defined in claim 25,
2 further comprising the step of:

3 forming on said conveyor belt said portion of
4 accumulation in which the packaging material is disposed
5 accumulated on and along a segment of said conveyor belt.

1 Claim 27 (new) The operating method defined in claim 26
2 wherein the sheet disposed on said conveyor belt has a
3 configuration comprising a further third portion in which the
4 packaging material is spread out on said conveyor belt and wherein
5 said third portion is positioned upstream with respect to said
6 portion of accumulation.

1 Claim 28 (new) The operating method defined in claim 27
2 wherein the said configuration of the sheet having an accumulated
3 portion of material is of the undulating type with a single crest.

1 Claim 29 (new) The operating method defined in claim 27
2 wherein the said configuration of the sheet having an accumulated
3 portion of material is of the undulating type with at least two
4 crests.

1 Claim 30 (new) The operating method defined in claim 27
2 wherein the said configuration of the sheet having an accumulated
3 portion of material is of the gathered type.

1 Claim 31 (new) The operating method defined in claim 24
2 wherein a phase relationship is provided between the said sheet
3 conveyor and said sheet wrapper in which, when the initial part of
4 the said accumulated portion of material reaches the proximity of
5 the said first opening, the wrapping bar passes through the said
6 first aperture to initiate a phase of conveying the sheet.

1 Claim 32 (new) The operating method defined in claim 24
2 wherein the first, second and third conveyors are driven at
3 constant speed in order to transport the objects with a constant
4 motion from the entry to the exit end, and wherein the sheet
5 wrapper and/or the sheet conveyor are driven at variable speed in
6 order to produce phase relationships for the execution of the
7 wrapping operations.

1 Claim 33 (new) The operating method defined in claim 24,
2 in which the objects are advanced in individual succession from an
3 upstream side toward downstream side and in which for each object
4 to be packaged the following steps are provided:

5 moving on said conveyor belt (51) and toward said first
6 opening a sheet having a configuration that comprises at least a
7 portion of accumulation of packaging material in which the packing
8 material is accumulated along a segment of said conveyor belt;

9 supplying a front portion of the sheet towards an
10 entry end of the said second object conveyor in phase with the
11 arrival of the object on the second conveyor, the said front
12 portion of the sheet being disposed between the object and a
13 transport surface of the second object conveyor;

14 moving the wrapping bar upward through said first
15 opening, when the rear end of the object has passed beyond the said
16 first opening and when the portion of accumulation of packaging
17 material is in proximity of said first opening;

18 moving the wrapping bar along the orbital path above the
19 object and in the downstream direction drawing said accumulated
20 portion supplied toward said first aperture by said conveyor belt;

21 moving the wrapping bar beyond the object and then
22 downwards through said second opening before the object reaches the
23 second aperture itself, dangling a terminal part of the piece of
24 the sheet between the said second conveyor and the said third
25 conveyor means; and

26 moving the object from the second conveyor means to the
27 third conveyor and placing the terminal part of the sheet beneath
28 the object.

1 34. (New) The operating method defined in claim 24
2 wherein said machine additionally comprises a sheet feeder, located
3 upstream of said sheet conveyor, for feeding sheets of packaging
4 material towards and onto the conveyor belt of the sheet conveyor,
5 wherein the accumulated portion of material provided for the sheet
6 is formed on the conveyor belt (51) by using for the said sheet
7 feeder feeding speed for the sheets greater than a conveying speed
8 of the conveyor belt of the sheet conveyor means.

1 35. The operating method defined in claim 34 wherein the
2 configuration of the sheet having an accumulated portion of
3 material is of the undulating type with a single crest and is
4 produced by means of the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to a transport speed of the
7 belt imparted by the sheet conveyor means, thus producing on the
8 conveyor belt a first portion which is spread out;

9 a second phase in which a transport motion of the
10 conveyor belt of the sheet conveyor is temporarily stopped, while
11 a motion for feeding the sheet of the sheet feeder is maintained,
12 thus producing a second, undulating accumulated portion of
13 material, and

14 a third phase in which the speed of feeding the sheet
15 imparted by the sheet feeder is equal to the transport speed of the

16 belt imparted by the sheet conveyor means, thus producing on the
17 conveyor belt a third portion which is spread out.

1 36. (New) The operating method defined in claim 35
2 wherein the configuration of the sheet having an accumulated
3 portion of material of the undulating type with at least two crests
4 is produced by reflecting the second and third phases one or more
5 times.

1 37. (New) The operating method defined in claim 34
2 wherein the configuration of the sheet having an accumulated
3 portion of material of the undulating type with at least one crest
4 is produced by means of the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to a transport speed of the
7 belt imparted by the sheet conveyor, thus producing on the conveyor
8 belt a first portion which is spread out;

9 a second phase in which the speed of feeding the sheet
10 imparted by the sheet feeder is greater than the transport speed of
11 the belt imparted by the sheet conveyor, thus producing on the
12 conveyor belt a second, accumulated portion of material which is
13 undulating with a crest, and

14 a third phase in which the speed of feeding the sheet
15 imparted by the sheet feeder is equal to the transport speed of the

16 belt imparted by the sheet conveyor, thus producing on the
17 conveyor belt a third portion which is spread out.

1 Claim 38 (new) The operating method defined in claim 37
2 wherein the configuration of the sheet having an accumulated
3 portion of material of the undulating type with two or more crests
4 is produced by repeating the second and third phases.

1 Claim 39 (new) The operating method defined in claim 34
2 wherein the configuration of the sheet having an accumulated
3 portion of material of the gathered type is produced by means of
4 the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to the transport speed of the
7 belt imparted by the sheet conveyor, thus producing on the conveyor
8 belt a first portion which is spread out; and

9 a second phase in which the speed of feeding the sheet
10 imparted by the sheet feeder is greater than the transport speed of
11 the belt imparted by the sheet conveyor, thus producing on the
12 conveyor belt (51) a second, accumulated portion of material which
13 is gathered.

1 Claim 40 (New) The operating method defined in claim 34
2 wherein the said sheet feeder is provided with a cutter and the
3 said sheet feeder initially feeds towards the said conveyor belt
4 the front portion of a continuous strip after which the said
5 continuous strip is cut by said cutter in order to produce the
6 sheet.

1 Claim 41 (New) The operating method defined in claim 34
2 wherein the sheet feeder is driven with a constant motion and the
3 sheet conveyor is driven with a variable motion.

1 Claim 42 (New) The operating method defined in claim 34
2 wherein an angle of incidence between a plane in which the sheets
3 are fed and a plane in which the sheets are conveyed is varied in
4 order to obtain the desired configuration of the accumulated
5 portion of the sheet.

1 Claim 43 (new) A packaging machine comprising:
2 a first object conveyor for feeding the objects
3 longitudinally in a spaced sequence;
4 a second object conveyor, located downstream of and at a
5 short distance from said first object conveyor thus forming a first
6 opening between said first and said second object conveyors for
7 receiving objects arriving from said first object conveyor and for

8 transporting said objects along a wrapping plane which has an entry
9 end and an exit end;

10 a third object conveyor located downstream of and at a
11 short distance from said second object conveyor and forming
12 therewith a second opening between the second and said third
13 object conveyors for receiving the objects arriving from said
14 second object conveyor;

15 a sheet wrapper, located in proximity to said second
16 object conveyor and comprising at least one suspended wrapping bar
17 which is oriented transversely with respect to a direction of
18 advance of the objects and adapted to move through said first and
19 said second openings along an orbital path which circumscribes the
20 top of the said second object conveyor, and can transport said
21 sheets;

22 a sheet conveyor having a conveyor belt, positioned
23 underneath and aligned with said first opening, for feeding the
24 sheets into said first opening (A1); and

25 a synchronizer for synchronizing said conveyor and said
26 sheet wrapper with each other,

27 said first, second and third object conveyors being
28 driven by a first servo motor connected to said synchronizing;

29 said sheet wrapper being driven by a second servo motor
30 connected to the said synchronizer;

31 said sheet conveyor being driven by a third servo motor
32 connected to said synchronizer and transporting towards the said

33 first opening said sheet of wrapping material having an accumulated
34 portion of material; and

35 said synchronizer comprising a programmable control unit
36 which controls the said first, second and third servo motors in
37 such a way that the said wrapping bar picks up the said accumulated
38 portion of material in the proximity of the said first opening and
39 then conveys the sheet around the object.

1 Claim 44 (New) The packaging machine defined in claim 43
2 wherein said conveyor belt of the sheet conveyor is of the suction
3 type.

1 Claim 45 (New) The packaging machine defined in claim 44
2 wherein said machine additionally comprises a sheet feeder, located
3 upstream of said sheet conveyor, for feeding sheets of packaging
4 material towards and on the conveyor belt of the sheet conveyor,
5 said sheet feeder being driven by a fourth servo motor connected to
6 said synchronizer; said programmable control unit controlling the
7 fourth servo motor; and in order to produce the accumulated portion
8 of material, said programmable control unit controls the speed of
9 the said third servo motor and of the said fourth servo motor in
10 such a way that the transport speed of the conveyor belt of the
11 sheet conveyor is lower than the sheet feeding speed of the sheet
12 feeder.

1 Claim 46 (new) The packaging machine according to claim
2 43 wherein said sheet feeder additionally comprises a cutter for
3 cutting a continuous strip of packaging material in order to
4 produce the sheets, said cutter being driven by a servo control
5 unit and controlled by the synchronizer.

1 Claim 47 (new) The packaging machine according to claim
2 43 wherein said sheet feeder is oscillatable angularly about an
3 axis lying parallel to a plane of transport of the sheets formed by
4 the conveyor belt, to make it possible to adjust an angle of
5 incidence between a plane in which the sheets are fed and a plane
6 in which the sheets are conveyed.

1 Claim 48 (new) The packaging machine according to claim
2 43 wherein an outer casing is provided to enclose operating
3 elements said sheet feeder in order to avoid contact between the
4 material forming the accumulated portion and the said operating
5 elements.